

Report on the 23rd IUBMB Congress - 44th Annual Meeting of the SBBq

Phillip Nagley and Janet Macaulay report on the 23rd International Congress of Biochemistry and Molecular Biology recently held at Foz do Iguaçu, Brazil.

This report, written by Phillip Nagley and Janet Macaulay, was published in the December 2015 issue of the Australian Biochemist and is reproduced with their permission.

General Aspects of the Congress

The 23rd IUBMB Congress and 44th Annual Meeting of the Brazilian Society for Biochemistry and Molecular Biology (SBBq) was held in Foz do Iguaçu, 24–28 August 2015. The meeting was held in the very well appointed Rafain Palace Hotel and Convention Center, located a few kilometres from the city centre of Foz do Iguaçu. The convention centre is an annex to the hotel itself, with several adjacent huge halls in which were located the plenary lecture room, the poster display area and the extensive trade exhibition. Other lectures were held in parallel sessions in a series of smaller rooms located throughout the building complex. Technical talks and workshops also took place, as well as specific meetings of societies and other groups associated with the Congress.

The theme of the Congress was 'Biochemistry for a Better World' and attracted more than 2,700 registrants, of whom nearly 60% were female and about 40% male. The vast majority of participants (almost 2,380) were from Brazil and 324 were non-Brazilian. Classified by career stage, there were 735 senior researchers, 253 postdocs, 1,173 postgraduate students and 542 undergraduate students. The last-named represent an increasing trend worldwide to provide undergraduates with exposure to top quality science and to see how major scientific meetings are presented. From our recent experience, when this was done at ComBio2015 in Australia, for many students it is a real eye-opener!

The Congress was organised into a program of plenary talks that took place first at the opening session on the afternoon of 24 August, then on the next three full days of the Congress just before and just after the lunch break, and on the last day before the closing session on 28 August just before lunch. On most days there were four or five parallel sessions of Symposia each morning and then again later in each afternoon. Alongside these, on the three full days of the Congress there was a full program throughout the day of well-attended technical seminars put on by companies supplying equipment and specialised products.



Panoramic view from the Brazilian side of the Iguazu Falls

Plenary Speakers

The plenary speakers in Foz do Iguaçu maintained the outstandingly high standards that one expects to find at an International

Congress of Biochemistry and Molecular Biology. The quality of the speakers, including four Nobel laureates, and the breadth of the topic areas that they covered in biology and biomedicine at molecular levels, can be seen in the list below.

Note that there were fewer plenary speakers at this Congress than in previous ones, because of the layout of the program. However, there were many top quality international speakers in the 34 Symposia of this Congress, which collectively covered many topics in biochemistry and molecular biology, with applications to biotechnology, medicine and agriculture.

Plenary Lectures at Foz do Iguaçu

EC Slater Lecture: Tom Steitz (USA) – Nobel Prize in Chemistry 2009

From the structure and function of the ribosome to new antibiotics

IUBMB Lecture: Martin Chalfie (USA) – Nobel Prize in Chemistry 2008

Determining neuronal fate in C. elegans

IUBMB Life Lecture: Salvador Moncada (UK)

Nitric oxide, cell bioenergetics and proliferation: exploring some basic mechanisms

FEBS Lecture: Günther Meister (Germany)

RNA binding proteins as modulators of coding and non-coding RNA pathways

Severo Ochoa Lecture: Kurt Wüthrich (USA) – Nobel Prize in Chemistry 2002

NMR spectroscopy in molecular structural biology

Osamu Hayaishi Lecture: José Onuchic (USA)

From structure to function: the convergence of structure based models and co-evolutionary information

Yagi Lecture: Johann Deisenhofer (USA/Germany) – Nobel Prize in Chemistry 1988

Structural biology of photosynthetic light reactions

PABMB Lecture: Bruce Alberts (USA)

The problems and challenges in biomedical sciences

Education Symposia, Science Writing Workshop and other Events

The Congress featured two Symposia on Education, each embedded in the program as a full Symposium. At the first, denoted Science Education 'Leopoldo de Meis' (named in honour of the well-known former Chair of the IUBMB Education Committee from Brazil, who sadly passed away in December 2014), the keynote speaker was Bruce Alberts. He spoke on the topic of the Critical Importance of Science Education for Society. Bruce emphasised that science learning in college (high school) must come from inquiry not rote learning. He also pointed out the need for teachers to change their approaches to achieve this goal. He emphasised the need for scientists to give talks to wider audiences on their discoveries. In praising the beauty of science through its universal language, he underlined the role of science as an integral part of modern human culture, citing Jacob Bronowski's erudite writings in *Science and Human Values* (published in 1956). Bruce Alberts also gave a plenary lecture on keeping science healthy (see below). Another speaker in this first Education Symposium extended Alberts' theme by giving specific examples of classroom teaching and learning based on direct engagement by students with experimental projects. The third speaker touched on neurobiological approaches to understanding the learning process, particularly related to influences of student experiences on their learning and its assessment.

The second Education Symposium was entitled 'PABMB: Teaching Biochemistry in a Connected World'. Each of the first three talks from South American educators dealt with different aspects of teaching, learning or assessment, in relation to resources available on the internet or as apps on mobile phones. The fourth talk dealt with a very important topic relevant to one of Bruce Alberts' themes above, namely: hands-on inquiry-based biochemistry courses for improving scientific literacy of school teachers and students (delivered very appropriately by Dr Poian from the Instituto de Bioquímica Médica Leopoldo de Meis, at the Federal University of Rio de Janeiro).

A Workshop on 'Writing in Science: A Fundamental Skill for Scientists' was given by Phillip Nagley as an interactive presentation to about 65 mostly early career scientists at the Congress. Topics covered included tips on writing clearly and concisely, using well-structured argument to make points as a general skill, then moving on to specific skills in writing manuscripts for publications, grant applications and references on behalf of others. Special attention was paid to the need to be very focussed in responding in writing to reviewers' comments on submitted manuscripts and to assessors' comments on grant applications. The latter two topics aroused the greatest interest in the discussions, which was also turned around to deal with skills needed in writing manuscript reviews and assessing grant applications.

There was a program for year 5 students at a local primary school who, over the course of three days, baked bread and answered the question 'What makes bread rise?' The children were able to look at the yeast under a microscope and show that the cells were alive. The concepts thereby included Biology (cells) and Chemistry (chemical reactions of fermentative gas release) – biochemistry at its best!



The Devil's Throat at Iguazu Falls viewed from the Argentinian side

Poster Discussion Sessions

Poster sessions, timetabled on each of the three full days of the Congress, were also very active, successful events. There were approximately 1,860 posters presented in a dedicated section of the Exhibition Halls, adjacent to the Trade Display. The posters were organised under a total of 20 themes and topic areas to help showcase the wide breadth of science being presented. Each poster had to be mounted by 12 noon of the relevant day, with a dedicated discussion time between 6–8 pm on that day. The relatively late finish reflects the Brazilian style of dinner being taken rather late in the evening. This was not unreasonable at this Congress, since the buffet lunches provided at the Rafain Palace Hotel were huge.

Young Scientist Program

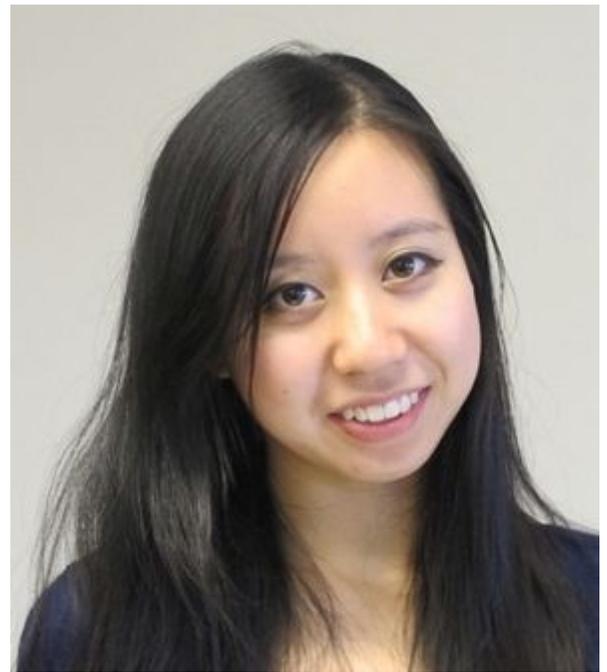
The main Congress was preceded by the Young Scientist Program (now held together with each IUBMB Congress, and most recent IUBMB Conferences) this year held in São Paulo, Brazil, during 20–23 August. Phillip was again privileged to attend the YSP this year, having organised the corresponding event five years ago at OzBio2010, in the Yarra Valley, near Melbourne; he also attended the YSP at the IUBMB Congress in Spain in 2012. The start of the YSP scientific program was held at the Howard Johnson Hotel where the YSP Fellows and the senior faculty colleagues stayed. That hotel is relatively close to the University of São Paulo (USP), where the most of the other YSP sessions of the Program were held (although it took about 45 minutes to drive there by bus, in the heavy traffic of that very busy city). The YSP Fellows comprised 49 selected young scientists, of whom 11 were from Brazil and 38 from overseas; all of the latter received assistance to participate in the form of international Travel Fellowships (awarded after review of their competitive applications). Nearly 190 applications were received and the selected PhD students and postdocs who attended the meeting (28 female and 21 male) came from 20 countries of residence (including one from Australia, Pearl Lee from the University of Sydney). The intensive program during the three-day meeting consisted of scientific sessions comprising ten-minute talks (with three minutes for discussion) given by all YSP Fellows. Remarkably, the timing was kept to schedule in almost all of the seven scientific sessions, due to the excellent preparation on the parts of nearly all the YSP Fellows and rigorous but cheerful chairing by the senior faculty people involved. There were two guest lectures, both from Brazil: Leda Q. Vieira (Universidade Federal de Minas Gerais) who spoke on interferon γ in the mammalian response to infection with the leishmanial parasite (sleeping sickness, carried by sandfly vectors), and Shaker Chuck Farah (Instituto de Química, USP) on the type IV secretion system in bacteria. The YSP program also included social activities and two tours: one was to some of the excellent technical facilities at USP (in nuclear physics, in NMR and in cell biology); the other was to downtown São Paulo. On this, his first trip to South America, Phillip found that downtown São Paulo is much less impressive than corresponding parts of Rio de Janeiro!



YSP Group outside the Howard Johnson Hotel in São Paulo



Phillip Nagley chairing a YSP session



Pearl Lee.

Reflections by Bruce Alberts

In the last session of the Congress, in the presence of an almost full plenary hall, Bruce Alberts (of Molecular Biology of the Cell textbook fame, President of the National Academy of Sciences USA (1993–2005) and editor-in-chief of Science magazine (2008–2013)) gave a stirring lecture on general aspects of science today, extending significantly what he had presented three years earlier in Seville at the previous IUBMB Congress. Speaking on the topic of 'The Problems and Challenges in Biomedical Sciences', he considered several major challenges facing today's science enterprise and the scientists of tomorrow, providing many examples of resources available to help us appreciate the process of how knowledge arises and is applied to gain often quite unexpected outcomes. He developed this notion to decry the risk-averse policies of the current funding of scientific projects, by pointing out that it is from the 'white spaces' in broad fields not currently populated by many scientists that the new discoveries and technical advances will be made. In this context he mentioned the remarkable developments that led to the CRISPR-Cas system of bacterial defence (that destroys genomes of invading viruses) being applied by an increasing number of researchers to the mutagenesis of specific mammalian target genes. Alberts asked how we ever could come to an understanding of the workings of the human brain without fundamental studies on simpler organisms such as drosophila, at a time when funding agencies are increasingly avoiding the support of work on such model organisms.

His further comments dealt with the oversupply of PhD graduates relative to available jobs in academic and research fields, leading to consideration of productive alternative career paths for PhD graduates. A further troubling trend is for the age distribution of established independent researchers to have shifted markedly to higher age groups over the past 30 years. Alberts noted that over the same period, the proportion of grants to researchers in the US going to scientists under 36 years of age has dropped sharply. He discussed options for changing this situation so that the best of the active and productive young minds are funded much better for innovative research, in contexts outside the 'siloes' thinking of current funding agencies. "Doing nothing is not an option," he declared, "The stakes are enormous."



Toucan at the Parque Das Aves near Foz do Iguazu, Brazil

Social Events & Official Functions

Highlights of the meeting were the great opportunity to meet old friends and new colleagues in a relaxed atmosphere, against a background of serious top quality science. The location of the Congress so close to the Falls of Iguazu (Foz do Iguazu in Portuguese) provided a wonderful opportunity to see one of the wonders of the natural world, just an hour's drive from the city (whose economy depends largely on tourism, alongside agriculture). There are in fact 275 separate falls, the most impressive of which is a U-shaped cataract nicknamed Garganta do Diabo – The Devil's Throat, which has 14 falls plunging about 100 metres. Collectively, the Falls are waterfalls of the Iguazu River located on the border of the Brazilian state of Paraná and the Argentine province of Misiones. Many participants at the Congress made two separate trips to the Falls, one to the Brazilian side to get panoramic views, the other to the Argentinian side where much closer views of individual waterfalls can be obtained. Another trip taken by many at the Congress was to the wonderful Bird Park (Parque Das Aves) close to the Brazilian side of the Falls. All of these attractions are set in national parks of rainforest with an abundance of wildlife.

One highlight of the social program was a special Congress dinner, held at a Churrascaria (a Brazilian barbecue venue) with excellent dining and a very entertaining show. The Iporã show was a wonderful pageant of music and dance from around South America, including Paraguay, Peru, Chile, Argentina, México and Brazil (culminating in the inevitable Carnaval do Brasil so distinctive of that country).

The Closing Ceremony included presentations on the following upcoming IUBMB events: the 16th IUBMB Conference to be held in Vancouver, Canada, 17–21 July 2016; and the 24th IUBMB Congress to be held in Seoul, Korea, 4–9 June 2018



Promotion of the next IUBMB Congress to be held in Seoul, Korea, in 2018. From left: Jin Won Committee), Assistant to the Organising Committee), Phillip Nagley Korean dress and Joon Kim (Organising Committee)

IUBMB General Assembly

The Ordinary General Assembly of IUBMB took place on 28 August 2015. Phillip and Janet were appointed by the Australian Academy of Science as Adhering Body to IUBMB, on the recommendation of ASBMB Council, to represent Australia at this formal triennial business meeting of IUBMB.



IUBMB Executive Committee members chairing the General Assembly. From left: Joan Guinovart (President), Gregory Petsko (Past President) and Michael Walsh (General Secretary)



Joan Guinovart (President, IUBMB)



Andrew Wang (President Elect, IUBMB)



From left: Michael Walsh (Canada), Janet Macaulay (Australia), Efstathios Gonos (Greece) and Francesco Bonomi (Italy)